MACROECONOMIC POLICIES AND EXCHANGE RATES

CONTENTS

This paper draws on several strands of work carried out in the Economics and Statistics Department. in particular by Paul Masson, Adrian Blundell-Wignall, Bixio Barenco and Gerald Holtham. It was collated and edited by Stephen Potter and Michael Feiner. who benefited from the helpful comments of a number of colleagues in the Department.

INTRODUCTION

Macroeconomic policy-making must take account of some assumed interaction with exchange rates, but this implies contending with serious difficulties: knowledge of the relevant mechanisms is imperfect and incomplete; there is not universal agreement on a single underlying theory of exchange-rate determination; and quantitative analysis does not provide definitive answers. Most systematic empirical work on the determination of exchange rates has not been very successful in uncovering stable relationships. Nonetheless, there appears to be a widespread presumption among policy makers that if a country wished to influence the level of its exchange rate, the way to achieve this would be an adjustment of monetary and/or fiscal policy relative to policy conduct in other countries. This presumption is predicated on the view that having incomplete knowledge does not preclude the prudent use of knowledge which does exist.

This paper assesses the scope for such usage by looking at qualitative, quantitative and historical evidence on the interaction between macroeconomic policies and exchange rates. While no single piece of evidence is particularly compelling in this area, and while the outcome for a given country will, in part, depend on the extent to which the exchange rate is itself an object of policy, the overall body of evidence suggests broadly that monetary and fiscal policies can influence exchange rates in a desired direction – at least if the policy adjustments are large enough and in harmony with each other.

The focus throughout this paper is on effective exchange rates, and on broad movements in rates (over quarters or years) rather than on very short-term fluctuations. Exchange market intervention is not discussed explicitly, though (unsterilised) intervention is of course one of the forms that "monetary policy" can take.

I. QUALITATIVE CONSIDERATIONS[1]

Monetary policy and the exchange rate

Most models of exchange-rate determination imply an unambiguous effect of monetary policy, defined in terms of money aggregates, on the exchange rate: a

more rapid rate of monetary expansion in one country, against the background of a stable demand for money, tends to depreciate the nominal exchange rate, and vice versa. This result is generally corroborated by empirical studies. Most theoretical models would predict that, in the long run, an increase in a country's money growth would be wholly reflected in the price level, with the relative increment in the latter offset by a depreciation of the exchange rate. But the suggested path to that final result differs from one model to another; some models suggest that there will be initial "overshooting" of the rate, with subsequent gradual correction, though the empirical evidence here is not strong.

In the long run, countries with relatively rapid money growth will tend to have high nominal interest rates as well as high inflation; ***real*** interest rates, though not necessarily equal across countries or unchanged over time, will tend to be unrelated to whether a country has high or low inflation. In the short run, interest rate changes, viewed as acts or consequences of monetary policy, seem to have the conventionally expected effect on exchange rates, at least in the large national models. An exogenous increase in the nominal – and by implication the real – interest rate differential is associated in all the national models examined with varying degrees of nominal exchange-rate appreciation.

However, a direct comparison between interest rate differentials (or changes therein) and exchange rates can yield misleading results, and casual observation of particular episodes can even suggest a "perverse" association. This may occur when other factors, for example expectations of inflation, are exerting strong pressure on the exchange rate and the authorities respond by adjusting interest rates, but insufficiently to outweigh the other forces. Experience suggests that if the authorities ultimately take sufficiently strong action, interest rate differentials assert themselves and have the expected effect on the exchange rate. None of the evidence gives reason to doubt that, other things being fixed (admittedly a strong assumption), a positive change in the interest rate differential in favour of a currency will cause it to be stronger than it otherwise would have been.

Policy changes abroad can of course influence exchange rates through their effects on interest rates and expectations, and less directly through their effect on relative macroeconomic performance (notably inflation and the current account). A rise in foreign interest rates will lead to incipient capital outflows or downward exchange-rate pressure. The extent of these ***ex ante*** pressures will depend on the degree of integration in international capital markets. The size of effects on the domestic economy will depend importantly on the degree to which downward pressure on the exchange rate is realised – which, in turn, depends on the way in which monetary policy is set.

For a country which targets monetary aggregates, a foreign interest rate increase will induce the currency to depreciate, thereby stimulating aggregate demand and increasing prices, both of which increase the demand for money. The consequent rise in interest rates will be greater, the lower is interest elasticity of

money demand and the higher the income elasticity. These parameters can differ greatly across countries, depending on such things as the degree of regulation of the banking system and the availability of near-bank substitutes. The choice of the monetary aggregate target also has an important influence on the share of the interest rate response: demands for broader aggregates, which include a greater proportion of deposits paying a competitive rate of interest, tend to be less elastic with respect to the general level of interest rates than are narrower aggregates. If, instead of targeting money, the authorities chose to target the exchange rate the consequences would also be quite different. If domestic assets are quite good substitutes for foreign assets, then a foreign interest rate increase can be expected to produce a roughly one-for-one rise domestically.

Fiscal policy and the exchange rate

The effect on the exchange rate of a change in fiscal policy, not accommodated by monetary policy, is indeterminate in theory. Rather it is an empirical question whose answer depends on the relative size of several key parameters. For example, an increase in the ***ex ante*** government budget deficit would be expected to raise the level of activity, the demand for money, and interest rates in the short run (assuming unused resources and that the interest-rate effects of the policy shift do not fully crowd out other expenditures). The magnitude of the effect on interest rates will depend on both the size of the spending multiplier and the income and interest elasticities of money demand and supply. The interest-rate increase will attract incipient capital inflows and put upward pressure on the exchange rate, the extent of these movements depending on the interest elasticity of capital flows. At the same time stronger economic activity will worsen the current account (the extent of deterioration depending on the demand elasticities of trade and the size of the domestic multiplier) and will very likely raise the rate of inflation, adversely affecting the country's price performance relative to competitors. This in turn will further worsen the current account (depending on the price elasticity of trade) and could also give rise to downward pressure on the exchange rate, to the extent that it adversely affects expectations. The effect on the exchange rate of the deterioration of the current account will itself depend on the extent to which domestic assets are imperfect substitutes for foreign assets (the elasticity of capital flows) and the degree of flexibility of wages and prices.

The many factors entering the analysis of the effects on exchange rates of a non-accommodated ex ***ante*** change in fiscal policy suggest that effects may well differ across countries. For the United States and a few other large countries the results considered below suggest that incipient capital inflows may indeed be sufficiently great to produce a real appreciation that lasts for some time. But for most other countries, particularly those where capital movements are significantly

restricted, the current account effect may predominate. In these cases expansionary fiscal policy may lead to real depreciation relatively quickly.

The latter result could be predicted with confidence whenever expansionary fiscal policy is accommodated by monetary expansion, perhaps because of attachment to an exchange-rate target. If the authorities act to keep interest rates broadly unchanged, any incipient effect on private capital movements could – apart from possible expectational effects – be expected to be minor, and the current account effect on the exchange rate would predominate. This result is indeed captured in national models, all of which suggest that fiscal expansion, accommodated by monetary expansion, will produce currency depreciation.

The exchange rate as policy target

The interaction between macroeconomic policy and exchange rates will depend on the extent to which the exchange rate is itself an object of policy. This extent varies across countries, tending to reflect the degree of "openness" of economies. At one extreme, the relatively small share of foreign trade in GNP in the United States and the reserve currency status of the dollar have meant that U.S. authorities frequently pursued a policy of "benign neglect" of the exchange rate, avoiding intervention on the foreign exchange markets and directing monetary policy towards domestic objectives. In recent years the focus has been on inflation control, with the Federal Reserve seeking to control the money supply as an intermediate target. The exchange rate has served primarily as an ***information variable.*** For example, the depreciation of the dollar in the period up to November 1978 provided information that excessive inflationary pressures were developing which, in turn, led to the adoption of restrictive monetary measures.

At the other extreme some countries have adopted the exchange rate as an ***explicit policy target*** – aiming to stabilize parities, particularly vis-à-vis the Deutschemark. Countries at this end of the spectrum include the EMS countries France, Italy, the Netherlands and Belgium but also, less formally, Sweden and Austria. Within this group the Netherlands, Austria and to some extent Belgium pursue a "hard currency" option: fixing the exchange rate vis-à-vis the Deutschemark is normally given priority in formulating monetary policy, and domestic costs are forced to adjust to maintain competitiveness. Provided dominant countries pursue non-inflationary policies, the adoption of such an approach by a small country will tend to permit stable monetary developments to be imported from abroad. This will imply some convergence in performance with major trading partners.

Differences may still arise if the economy is subject to various domestic influences – in particular, increased fiscal spending financed by domestic bank credit expansion may be directed towards achieving independent objectives for supporting output and employment. Amongst countries targeting the exchange rate, France and Italy are relatively larger in size and attempt also to achieve objectives for

domestic money and credit aggregates (M2 and total domestic credit, respectively). The requirement to intervene to manage the exchange rate may lead to inconsistencies with domestic policy objectives. These may be reconciled in the short run by resort to sterilization operations, quantitative controls on both domestic credit expansion and the foreign exchange market, and compensatory financing. In the longer run, however, such inconsistencies have typically been reconciled by abandoning either the exchange rate or domestic money supply targets. In 1976 and 1977 domestic credit expansion was severely squeezed in both countries in order to achieve exchange rate objectives. Since the inception of the EMS both countries have, on a number of occasions, required realignments of central rates vis-6-vis the Deutschemark.

Other countries – e.g. Japan, Germany, the United Kingdom, Canada and Switzerland – use the exchange rate primarily as an indicator for monetary policy. All have formulated monetary policy in terms of targets for domestic money aggregates, but developments at home relative to those abroad have led to unwanted movements of the exchange rate. Canada and Switzerland are somewhat special cases in that they are closely linked through trade and finance to the United States and Germany, respectively. To avoid depreciation-induced inflation, Canada has frequently adjusted its interest rates in line with movements of rates in the United States. Switzerland, where policy is less constrained by unemployment, has generally been more able to orient domestic monetary policy towards inflation control.

II. QUANTITATIVE EVIDENCE

Pitfalls to avoid

Exchange rates clearly are affected by many factors other than fiscal and monetary policy. These include supply-side shocks and structural factors such as natural resource discoveries, as well as a variety of short-term and "political" influences. Many such factors cannot easily be quantified since their separate influences are typically difficult to disentangle, even with sophisticated econometric techniques.

One of the problems encountered here by empirical analysis – and especially casual empiricism – arises from the fact that the exchange rate is "endogenous", i.e. it is in part determined by variables which it also powerfully affects. Some of the phenomena – for example inflation differentials or current accounts – by which the exchange rate is often "explained" are also endogenous. This makes simple explanations perilous. Exchange rates can be related satisfactorily to their causes only if the latter are exogenous, or if an observed association between exchange rates and other endogenous variables is expressed with care.

Key relationships depend importantly on the policy regime under which a country is operating. For example, if a country is pursuing a money target, an upward shift in the demand for money will tend to push up interest rates and lead to strengthening of the exchange rate. On the other hand, a country with an exchange-rate target will tend to raise interest rates in response to currency weakness. Simple relationships observed after the event might suggest that an increasing positive interest differential is associated in one case with appreciation, in the other with depreciation.

A further pervasive problem in empirical work is the central importance of expectations in exchange markets, as in asset markets generally. Expectations are extremely difficult to capture, yet they can often outweigh the influence of other exchange-rate determinants. For example, there is widespread agreement at the theoretical level that, other things being given, more rapid monetary growth will tend to weaken the nominal exchange rate. Yet on some occasions the announcement of more rapid money growth than expected has apparently led, at least for a while, to higher interest rates and exchange-rate appreciation, because it was expected that the authorities would move to reverse the money bulge. Expectational effects do not necessarily work against what policy is attempting to achieve: but their importance is something that policy-makers must respect, and in some circumstances may even seek to exploit.

A further difficulty in empirical analysis is that, as noted above, policy – in particular fiscal policy – may affect the exchange rate through more than one channel. The direction of these various effects may not be the same, depending on the relative size of key parameter values. These values may be difficult to estimate with sufficient precision to give a clear answer and may differ across countries and over time.

Three levels of modelling

Empirical work on exchange-rate determination may be classified into three "levels" of modelling. "Single-equation" work relates movements of particular currencies directly to one or more determinants, generally either policy variables or variables affected by policy. A second level is to look at the exchange-rate responses to specified changes in fiscal and monetary policy displayed by a number of large national models. The third step examines multilateral financial models. These attempts at modelling are still in their infancy, and in many respects less well developed than national modelling efforts, but they are able to exploit the cross-country adding-up constraints that must be satisfied when considering the implications of policies, or other developments, for exchange rates. Any exchange-rate change has to have a counterpart: if one currency appreciates, others must on average depreciate.

Reported econometric work on single-equation models of exchange-rate determination[2] does tend to suggest impacts of policy on exchange rates with signs conforming to a *priori* expectations. However, typically firm and robust relationships have not been easy to obtain. More fundamentally, it might be argued that single-equation results in this area reflect only an isolated part of the macroeconomic system and that it may be appropriate to assess policy/exchange-rate interaction on the basis of whatever insights may be derived from more fully-elaborated models.

The second-level approach is typified in a study which appeared in the last issue of this journal[3]. In the study a number of national models were subjected to the same set of shocks. Two of these, dealing with the effect of changes in fiscal and monetary policy on exchange rates in seven national models[4], are summarized below. (Detailed results appear in Tables 5 and 10 of the earlier paper.) As will be seen, exchange-rate responses are somewhat diverse, because while most national econometric models feature Keynesian income-expenditure elements and less than perfectly elastic capital flows, they are otherwise rather eclectic in inspiration. In the study discussed, movements in exchange rates in response to a standard fiscal shock (a cut in government expenditures equivalent to 0.5 per cent of real GDP) can be separated into two groups. The first group simulates an exchange-rate depreciation; second, appreciating exchange rates. In the latter group, a current account surplus position has a dominant influence on exchange markets. In the former group, the fall in domestic interest rates and the induced deterioration on capital account dominates. By contrast, with accommodating monetary policy a fiscal cut leads to an appreciation in all the national models. This is a direct implication of the assumption of accommodating monetary policy (which holds policy-controlled interest rates constant), thereby permitting the emergent current account surplus to dominate capital flow considerations in exchange-rate determi-nation.

Considering the simulated effects of a monetary shock (an increase in interest rates of 1 percentage point) under floating rates, there is a strong but differential tendency for exchange rates to appreciate in response to tight monetary policy. This obviously strengthens the restrictive impact of monetary policy on economic activity. Further, the modest endogenous tendency for domestic inflation to fall is reinforced by yet more depressed domestic demand and an improvement in the terms of trade. In some country models there is a reversal of the impact of restrictive monetary policies on economic activity by the seventh year, owing to wealth effects.

This overall picture of exchange-rate response to policy changes is broadly confirmed, at the third level, by several "world" or multi-country models: the Japanese Economic Planning Agency's World Economic Model, the Federal Reserve Board's Multi-Country Model and the models of Project Link. The responses of exchange rates in these models follow more or less closely those of national models.

	1977 Q1	1977 Q2	1977 Q3	1977 Q4	1978 Q4	1979 Q4	1980 Q4	1981 Q4
EPA world model								
Germany ($/DM)	−1.61	−1.53	−1.81	−2.18	−4.44	−6.78	−9.81	−8.47
Japan ($/Yen)	−1.04	−1.69	−2.17	−2.00	−3.20	−4.77	−6.95	−5.34
United States (Wt. Av./$)	−0.01	−0.20	−0.28	−0.21	0.29	1.27	2.51	3.24
FRB multi-country model								
Germany ($/DM)	0	−0.2	−0.5	−0.8	−2.5	−4.4	−6.4	−7.6
Japan ($/Yen)	−0.1	−0.2	−0.4	−0.6	−1.2	−2.0	−3.1	−3.8
United States (Wt. Av./$)	0.1	0.2	0.4	0.7	0.9	0.2	−0.2	0
Link								
Germany ($/DM)	−0.3	−0.7	−1.2	−1.6	−2.3	−4.0	−5.6	−8.0
Japan ($/Yen)	−0.2	−0.3	−0.7	−0.9	−2.0	−3.2	−6.0	−6.8
United States (Wt. Av./$)	−0.4	−0.5	0.2	0.8	1.0	1.2	2.0	2.5
B. Discount rate shock (2 percentage point decrease in home country discount rate)[a]								
EPA world model								
Germany ($/DM)	−4.18	−4.60	−4.26	−4.21	−5.83	−8.56	−15.55	−15.82
Japan ($/Yen)	−2.78	−3.52	−4.01	−4.66	−8.50	−8.23	−8.38	−8.14
United States (Wt. Av./$)	−0.96	−1.05	−0.94	−0.82	−0.74	−0.48	−0.44	−0.02
FRB multi-country model								
Germany ($/DM)	−1.4	−1.5	−1.8	−1.9	−2.0	−2.0	−2.1	−2.0
Japan ($/Yen)	−0.5	−0.6	−0.7	−0.7	−1.2	−1.8	−2.7	−3.1
United States (Wt. Av./$)	−0.6	−1.0	−1.2	−1.3	−1.0	−1.0	−1.1	−1.6
Link								
Germany ($/DM)	−2.3	−3.7	−4.0	−4.5	−4.7	−5.0	−5.2	−5.4
Japan ($/Yen)	−0.9	−1.0	−1.2	−1.2	−1.4	−2.0	−2.4	−2.7
United States (Wt. Av./$)	−1.4	−1.7	−2.0	−3.2	−3.3	−3.0	−2.6	−2.0

a) A targeted monetary aggregate is held at baseline values, interest rates are endogenous.
Source: Results presented at Project LINK meeting, Tsukuba, Japan, September 1983.

Table 1 shows exchange-rate changes resulting from a change in fiscal policy and a change in the discount rate in these three models (versions as of September 1983).

Effects of different exchange-rate regimes

The interaction between macroeconomic policies and exchange rates will be different depending on whether a country is engaged in "managed floating" (where both money-supply and exchange-rate objectives guide interest-rate setting) or "clean floating" (where non-intervention in exchange markets allows money supply

to be kept on target). This factor's impact on macro policy-exchange rate interaction was examined in a set of simulations carried out using a scaled-down seven-country version of the OECD Secretariat's INTERLINK model[5].

The simulations first consider an upward shift in the money demand schedule of one country (by 1 per cent in the long run). With unchanged money targets the domestic interest rate will tend to rise and the exchange rate to appreciate. The strength of the rise will depend on the degree to which money targets are achieved. In the managed floating case (Table 2) some monetary accommodation (based on estimated reaction functions) is allowed for, to prevent too great a rise in the value of the currency. In the clean float case, money is of course kept on target, so the impact on the exchange rate is much greater. However, the medium-term effect of the money-demand shift depends, among other things, on the interest elasticity of money demand and the degree of price flexibility (Table 3). If prices are flexible enough downward the nominal appreciation may be associated with a teal depreciation, and nominal interest rates may also be lower after ten semesters. The exchange rate appreciates gradually in response to the shock. This is a direct result of the adaptive expectations mechanism that has been specified – namely, a lagged

Table 2. Effects of a one per-cent increase in the long-run demand for money[a] under managed floating: percentage deviations from baseline

Variable	Semeste	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	–0.00	–0.00	-0.00	–0.00	–0.00	–0.00	–0.00
	10	–0.09	-0.06	-0.06	-0.02	0.02	-0.05	–0.01
GDP Deflator	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	–0.00	–0.01	–0.00	–0.01	–0.00	–0.00	–0.01
	10	-0.25	-0.27	-0.16	-0.19	-0.13	–0.09	-0.07
Short-term interest rate[b]	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	0.26	0.19	0.11	0.07	0.07	0.10	0.08
	10	0.20	0.03	0.03	–0.01	0.02	0.05	0.01
Rate[b] of inflation	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	–0.01	–0.01	–0.01	–0.01	–0.01	–0.01	–0.01
	10	–0.01	-0.11	-0.07	-0.07	-0.04	-0.03	-0.02
Nominal effective exchange rate	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	0.09	0.10	0.06	0.04	0.04	0.05	0.04
	10	0.31	0.33	0.21	0.19	0.15	0.16	0.09
Real effective exchange rate	1	0.00	0.00	0.00	0.00	0.00	*0.00*	0.00
	2	0.08	0.09	0.05	0.03	0.03	**0.05**	0.04
	10	0.02	0.05	0.02	–0.01	0.02	*0.07*	0.01
Money supply	1	0.19	0.48	0.21	0.33	0.30	0.22	0.40
	2	0.23	0.64	0.33	**0.52**	0.40	0.29	0.55
	10	0.13	0.59	0.58	0.76	0.71	0.53	0.88

a) Money demand schedule rises gradually to long-run level, in line with estimated speed of adjustment. Country models are linked, but shock is to home country only.
b) Deviation from baseline in percentage points.

Table 3. Effects of a one per-cent increase in the long-run demand for money[a] under cleanly floating exchange rates: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	–0.01	-0.04	-0.02	-0.02	–0.00	–0.00	–0.00
	2	-0.03	–0.10	-0.05	-0.07	-0.02	-0.03	-0.02
	10	-0.07	–0.01	-0.08	-0.1 1	-0.06	–0.10	-0.08
GDP Deflator	1	-0.02	-0.03	-0.02	-0.06	–0.01	–0.01	-0.03
	2	-0.04	-0.08	-0.05	-0.14	-0.04	-0.02	-0.07
	10	-0.45	–1.07	-0.67	–1.35	-0.49	-0.24	-0.56
Short-term interest rate[b]	1	0.41	1.10	0.55	0.74	0.19	0.23	0.35
	2	0.38	0.89	0.48	0.55	0.1 8	0.22	0.32
	10	0.1 1	-0.29	-0.15	-0.45	0.05	0.13	0.1 1
Rate[b] of inflation	1	-0.03	-0.06	-0.04	-0.1 1	-0.03	–0.01	-0.06
	2	-0.05	–0.10	-0.06	-0.1 7	-0.05	-0.02	–0.09
	10	-0.14	-0.30	-0.22	-0.25	-0.16	*-0.08*	-0.13
Nominal effective exchange rate	1	0.21	0.57	0.28	0.40	0.10	0.1 2	0.19
	2	0.34	0.83	0.43	0.60	0.18	0.1 9	0.32
	10	0.68	0.83	0.58	0.86	0.56	0.40	0.72
Real effective exchange rate	1	0.19	0.53	0.26	0.34	0.09	0.1 1	0.16
	2	0.27	0.74	0.37	0.46	0.14	0.1 7	0.24
	10	-0.03	-0.24	-0.17	-0.48	0.06	0.16	0.1 3
Money supply	1	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	2	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	10	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

a) Money demand schedule rises gradually to long-run level, in line with estimated speed of adjustment. Country models are linked, but shock is to home country only.
b) Deviation from baseline in percentage points.

adjustment to purchasing power parity. Rational expectations – or other somewhat forward-looking alternatives – would imply a much stronger initial appreciation.

An interesting related question is the degree to which countries are induced to import the monetary policy of their neighbours, even under floating exchange rates. A rise of 100 basis points in U.S. short-term interest rates has been simulated to help provide an answer. For simplicity, the monetary targets in the United States are ignored, but the interest-rate rise could have resulted from a lowering of target growth rates. Tables 4 and 5 report the effects of such a change on both the United States and the other countries considered in the simulation exercise, if they set monetary policy on the basis of historical policy reactions (Table 4) or, alternatively, if the money supply is strictly targeted (Table 5). In both cases, interest rates rise for all the remaining countries, so the latter do import the change in United States monetary policy. The degree of rise is smaller when they target money strictly, but it is nonetheless considerable.

Table 4. Effects of an increase in US interest rates by 100 basis points, with all other countries following a managed float: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	-0.03	-0.01	-0.03	-0.02	-0.02	-0.02	-0.01
	2	-0.08	0.00	-0.04	-0.03	-0.01	-0.00	-0.00
	10	-0.33	-0.14	-0.13	-0.29	-0.06	0.02	-0.04
GDP Deflator	1	-0.03	0.02	0.01	0.01	0.03	0.01	0.03
	2	-0.07	0.04	0.02	0.02	0.07	0.03	0.07
	10	-1.12	0.29	-0.06	-0.63	0.45	0.39	0.25
Short-term interest rate[a]	1	1.00	0.19	0.42	0.45	0.39	0.24	0.58
	2	1.00	0.32	0.57	0.61	0.48	0.31	0.69
	10	1.00	0.80	0.82	0.82	0.84	0.64	0.96
Rate[a] of inflation	1	-0.05	0.03	0.02	0.02	0.06	0.02	0.06
	2	-0.08	0.05	0.02	0.02	0.08	0.04	0.08
	10	-0.44	0.02	-0.08	-0.39	0.06	0.07	0.01
Nominal effective exchange rate	1	0.33	-0.39	-0.22	-0.13	-0.26	-0.26	-0.22
	2	0.50	-0.61	-0.32	-0.17	-0.42	-0.43	-0.35
	10	1.40	-1.49	-0.91	0.01	-1.42	-1.28	-1.29
Real effective exchange rate	1	0.28	-0.35	-0.19	-0.11	-0.21	-0.24	-0.17
	2	0.39	-0.51	-0.26	-0.13	-0.31	-0.38	-0.22
	10	0.18	-0.21	-0.12	-0.11	-0.12	-0.33	-0.00
Money supply	1	-0.46	-0.07	-0.13	-0.16	-0.56	-0.20	-0.59
	2	-0.85	-0.12	-0.29	-0.33	-1.06	-0.42	-1.04
	10	-3.22	-0.45	-1.25	-1.65	-3.26	-1.73	-2.25

a) Deviation from baseline in percentage points.

Table 5. Effects of an increase in US interest rates by 100 basis points under cleanly floating exchange rates: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	-0.03	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00
	2	-0.09	0.02	0.00	-0.00	0.02	0.02	0.04
	10	-0.35	-0.08	0.06	-0.05	0.19	0.22	0.18
GDP Deflator	1	-0.04	0.02	0.02	0.03	0.05	0.01	0.07
	2	-0.10	0.05	0.05	0.07	0.13	0.04	0.18
	10	-1.45	0.52	0.67	0.70	1.67	0.55	1.38
Short-term interest rate[a]	1	1.00	0.04	0.05	0.07	0.03	0.01	0.07
	2	1.00	0.14	0.11	0.15	0.07	0.03	0.14
	10	1.00	0.59	0.75	0.72	0.50	0.26	0.64
Rate[a] of inflation	1	-0.08	0.04	0.04	0.06	0.10	0.03	0.14
	2	-0.13	0.06	0.07	0.09	0.16	0.05	0.22
	10	-0.52	0.12	0.22	0.14	0.54	0.19	0.31
Nominal effective exchange rate	1	0.52	-0.46	-0.38	-0.24	-0.41	-0.29	-0.50
	2	0.87	-0.73	-0.62	-0.39	-0.71	-0.49	-0.87
	10	2.74	-2.06	-1.67	-1.11	-3.02	-1.69	-3.06
Real effective exchange rate	1	0.45	-0.41	-0.34	-0.20	-0.34	-0.27	-0.40
	2	0.68	-0.60	-0.51	-0.30	-0.53	-0.43	-0.60
	10	0.39	-0.37	-0.14	-0.11	-0.45	-0.70	-0.38
Money supply	1	-0.47	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	2	-0.89	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	10	-3.56	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*

a) Deviation from baseline in percentage points.

Table 6. Effects of a decrease in real government expenditure[a] with non-accommodating monetary policy under cleanly floating exchange rates: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	-0.73	-0.60	-0.69	-0.56	-0.45	-0.58	-0.50
	2	-0.72	-0.53	-0.55	-0.51	-0.44	-0.57	-0.49
	10	-0.44	0.02	0.06	0.25	0.26	-0.43	-0.36
GDP Deflator	1	-0.06	-0.03	-0.03	-0.07	-0.05	-0.02	-0.01
	2	-0.18	-0.11	-0.11	-0.02	-0.14	-0.06	-0.04
	10	-2.93	-1.32	-1.47	-1.68	-2.25	-1.03	-0.83
Short-term interest rate[b]	1	-0.34	-1.18	-0.71	-0.70	-0.11	-0.12	-0.12
	2	-0.50	-1.19	-0.81	-0.90	-0.15	-0.15	-0.14
	10	-2.36	-1.83	-1.31	-1.43	-0.67	-0.48	-0.46
Rate[b] of inflation	1	-0.12	-0.07	-0.07	-0.14	-0.09	-0.04	-0.03
	2	-0.24	-0.15	-0.15	-0.28	-0.19	-0.08	-0.06
	10	-0.97	-0.31	-0.36	-0.15	-0.73	-0.35	-0.28
Nominal effective exchange rate	1	-0.04	-0.55	-0.32	-0.29	-0.02	-0.04	-0.05
	2	-0.07	-0.83	-0.51	-0.47	0.01	-0.05	-0.07
	10	0.34	-0.75	-0.11	-0.06	1.48	0.50	0.31
Real effective exchange rate	1	-0.08	-0.58	-0.34	-0.36	-0.06	-0.06	-0.06
	2	-0.17	-0.91	-0.58	-0.67	-0.12	-0.11	-0.10
	10	-0.98	-1.75	-1.10	-1.54	-0.65	-0.44	-0.43

a) Equal to 0.5 percent of GDP, in the home country only; country models are linked, however.
b) Deviation from baseline in percentage points.

Turning to the effects of changes in fiscal policy, simulation results from the scaled-down INTERLINK model (Tables 6 and 7) illustrate some of the points made above. For all countries, under clean floating a cut in government spending accompanied by unchanged money growth tends to depreciate, but by varying amounts, the effective exchange rate in the short run. The exchange depreciation is largest – around half a percent – in Japan, Germany, and France, where money demand responds most strongly to real activity and where its interest elasticity is lowest. The short-run depreciation of the nominal exchange rate does not persist for all countries: the United States, the United Kingdom, Italy and Canada ultimately experience appreciation when money is kept on target.

However, in all cases there is a *real* depreciation, the ultimate magnitude of which depends on the size of government expenditure multiplier and on the degree of openness of the economy and hence the responsiveness of demand to real exchange-rate changes. The more open the economy, the less the real exchange rate has to change to establish internal balance. Whether the real depreciation corresponds to a nominal appreciation or not depends on the responsiveness of the

Table 7. Effects of a decrease in real government expenditure[a] under managed floating: percentage deviations from baseline

Variable	Semeste	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	-0.74	-0.64	-0.6 1	-0.58	-0.45	-0.59	-0.50
	2	-0.74	-0.64	-0.61	-0.58	-0.45	-0.58	-0.50
	10	-0.58	-0.47	-0.46	-0.55	-0.33	-0.01	-0.47
GDP Deflator	1	-0.07	-0.07	-0.06	-0.1 2	-0.05	-0.02	-0.02
	2	-0.20	-0.1 9	-0.17	-0.36	-0.16	-0.06	-0.07
	10	-3.39	-3.1 9	-2.95	-6.51	-2.56	-0.67	-1.23
Short-term interest rate[b]	1	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
	2	-0.22	-0.21	-0.1 5	-0.09	-0.07	-0.16	-0.03
	10	-2.05	-0.75	-0.52	-0.57	-0.48	-1.68	*-0.08*
Rate[b] of inflation	1	-0.13	-0.13	-0.12	-0.24	-0.1 1	-0.05	-0.05
	2	-0.26	-0.25	-0.23	-0.48	-0.20	-0.08	-0.09
	10	-1.17	-1.10	-1.02	-2.33	-0.86	-0.1 3	-0.45
Nominal effective exchange rate	4	0.03	0.04	0.03	0.07	0.03	0.01	0.01
	2	0.06	0.04	0.06	0.23	0.09	-0.03	0.04
	10	1.36	2.1 5	2.16	5.58	1.93	-1.03	1.07
Real effective exchange rate	1	-0.02	-0.02	-0.02	-0.05	-0.02	-0.01	-0.01
	2	-0.08	-0.14	-0.10	-0.12	-0.06	-0.09	-0.03
	10	-0.63	-0.73	-0.51	-0.74	-0.51	-1.57	-0.10
Money supply	1	-0.15	-0.51	-0.26	-0.31	-0.1 7	-0.1 1	-0.14
	2	-0.26	-0.78	-0.49	-0.64	-0.26	-0.08	-0.22
	10	-1.15	-3.37	-3.1 5	-6.57	-0.12	3.48	-1.31

a) Equal to 0.5 percent of GDP, in the home country only: country models are linked, however.
b) Deviation from baseline in percentage points.

price level. It seems that in the United States, especially, prices are flexible downwards; hence after ten semesters the United States exhibits a nominal appreciation in this simulation.

If external objectives help to guide monetary policy, as in the simulations reported in Table 7, then the effect on the exchange rate can be quite different. Here, the downward pressure on interest rates is less than in the previous set of simulations (except for Italy) because monetary targets are not being adhered to. For Italy, a high weight in the reaction function for resisting exchange-rate movements combined with a large effect attributed to debt cause greater downward pressure on rates after ten semesters than in the first simulation. In all cases, except, again, Italy, a spending cut brings about an exchange-rate ***appreciation,*** because of favourable price performance. One striking difference between the cases involving clean and managed floating is that in the former, output effects are positive after ten semesters for several countries, while in the latter they are all negative. There the

Table 8. Effects on each of the big seven countries of a decrease in United States real government expenditurea with non-accommodating monetary policy under cleanly floating exchange rates: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kingdom	Italy	Canada
Real GNP/GDP	1	-0.73	-0.13	-0.24	-0.16	**-0.14**	-0.19	**-0.10**
	2	-0.72	-0.13	-0.23	-0.16	-0.16	-0.21	-0.11
	10	-0.44	-0.14	-0.25	0.00	-0.54	-0.63	-0.52
GDP Deflator	1	-0.06	-0.02	-0.02	-0.04	-0.04	-0.02	**-0.03**
	2	-0.18	-0.05	-0.07	-0.12	-0.12	-0.05	-0.09
	10	-2.93	-0.98	-1.38	**-1.60**	-2.77	-1.10	-1.95
Short-term interest rate[b]	1	-0.34	-0.28	-0.32	-0.25	-0.05	-0.05	-0.05
	2	-0.50	-0.34	-0.40	-0.38	**-0.09**	-0.07	**-0.09**
	10	-2.36	-1.73	-1.75	-1.88	-0.93	-0.58	-1.06
Rate[b] of inflation	1	-0.12	-0.03	-0.04	-0.08	-0.08	-0.03	-0.06
	2	-0.24	-0.06	**-0.10**	-0.15	-0.16	-0.06	-0.13
	10	-0.97	-0.36	-0.51	-0.46	-1.16	**-0.47**	-0.76
Nominal effective exchange rate	1	-0.04	**-0.01**	-0.03	0.02	0.13	0.11	0.12
	2	-0.07	**-0.01**	-0.06	0.02	0.24	0.19	0.21
	10	0.34	-1.19	-0.83	-0.53	1.50	0.36	0.45
Real effective exchange rate	1	-0.08	0.04	0.00	0.02	0.14	0.14	0.15
	2	**-0.17**	0.11	0.03	0.03	0.27	0.28	0.29
	10	-0.98	0.61	0.42	0.05	1.26	1.54	1.34

a) Equal to 0.5 per cent of GDP, in the United States only; other countries' fiscal policies are unchanged.
b) Deviation from baseline in percentage points.

money supply is allowed to fall, and so interest rates are higher than they need be for purely domestic reasons.

Tables 8 and 9 show the effects, particularly on other countries, of a fiscal policy tightening in the United States. These effects include a depressive influence on economic activity in all countries, as well as downward pressures on prices and interest rates. The real effective depreciation of the dollar under either clean or managed floating has as its counterpart real appreciations, varying in magnitude, of other currencies. As has been pointed out above, the strength of an individual currency's relative appreciation depends on the nature of monetary policy reaction functions – in particular on the weights given to monetary targeting and to the exchange rate – and on the properties of the demand for money functions. Furthermore, the degree of price flexibility helps determine whether nominal and real exchange rate movements go in the same direction; under clean floating, the illustrative model used implies that they do not.

Table 9. Effects on each of the big seven countries of a decrease in United States real government expenditure[a] under managed floating: percentage deviations from baseline

Variable	Semester	United States	Japan	Germany	France	United Kinadom	Italy	Canada
Real GNP/GDP	1	-0.74	-0.15	-0.26	-0.17	-0.15	-0.20	-0.10
	2	-0.74	-0.15	-0.26	-0.17	-0.15	-0.20	-0.10
	10	-0.58	-0.29	-0.26	-0.13	-0.29	-0.43	-0.21
GDP Deflator	1	-0.07	-0.02	-0.03	-0.04	-0.02	-0.01	-0.01
	2	-0.20	-0.05	-0.08	-0.12	-0.07	-0.03	-0.03
	10	-3.39	-1.25	-1.51	-2.24	-1.77	-0.78	-0.78
Short-term interest rate[b]	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	-0.22	-0.09	-0.15	-0.14	-0.10	-0.07	-0.13
	10	-2.05	-1.24	-1.64	-1.68	-1.36	-0.93	-1.69
Rate[b] of inflation	1	-0.13	-0.03	-0.05	-0.07	-0.04	-0.02	-0.02
	2	-0.26	-0.06	-0.10	-0.16	-0.09	-0.04	-0.04
	10	-1.17	-0.52	-0.56	-0.79	-0.70	-0.33	-0.30
Nominal effective exchange rate	1	0.03	-0.03	-0.02	-0.00	-0.02	-0.02	-0.02
	2	0.06	-0.04	-0.05	0.01	-0.03	-0.03	-0.08
	10	1.36	-1.09	-1.13	-0.02	-0.61	-0.82	-2.04
Real effective exchange rate	1	-0.02	0.01	0.01	0.00	0.02	0.02	0.02
	2	-0.08	0.09	0.04	0.02	0.08	0.09	0.08
	10	-0.63	0.83	0.30	0.11	0.61	0.98	0.43
Money supply	1	-0.15	-0.12	-0.11	-0.10	-0.06	-0.04	-0.03
	2	-0.26	-0.17	-0.18	-0.16	0.02	0.02	0.07
	10	-1.15	-0.82	-0.40	-1.03	2.76	1.21	2.68

a) Equal to 0.5 per cent of GDP, in the United States only; other countries' fiscal policies are unchanged.
b) Deviation from baseline in percentage points.

III. THE HISTORICAL RECORD

Selected episodes of policy/exchange-rate interaction

It is of interest to consider how far some of the major exchange-rate changes since 1971 (Chart 1) do appear to reflect a direct and fairly immediate interaction with policy. Examination of developments in "G.10" countries[6] suggests that this interaction appears to have been weak during the first part of the period of floating. However, since 1976, monetary policy appears to have played an important role in a number of cases.

During the period of transition to floating (mid-1971 to mid-1973) the pattern of exchange-rate variations was more a reflection of pent-up pressure and

CHART 1

Relative monetary growth, interest rate differentials and exchange rates

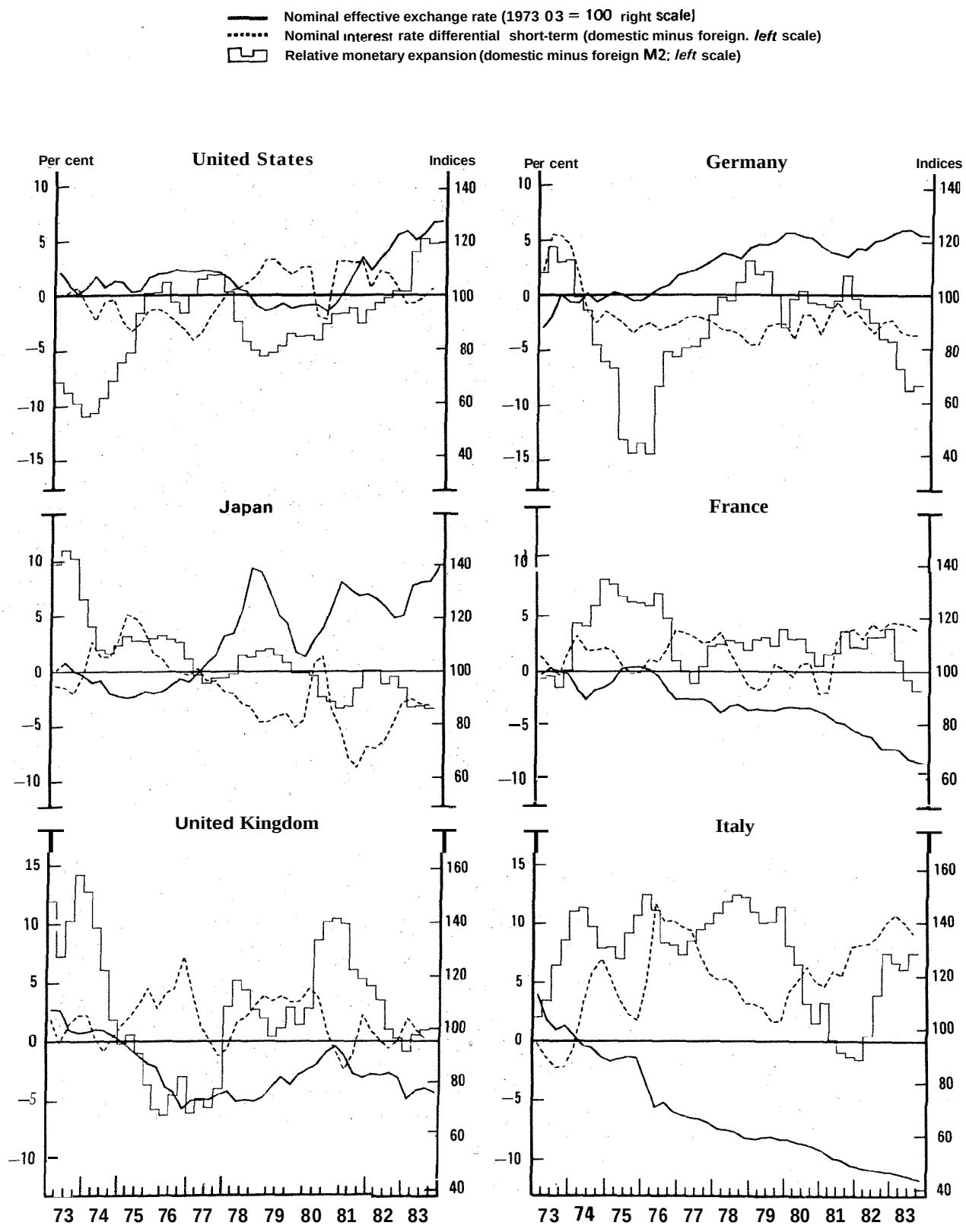
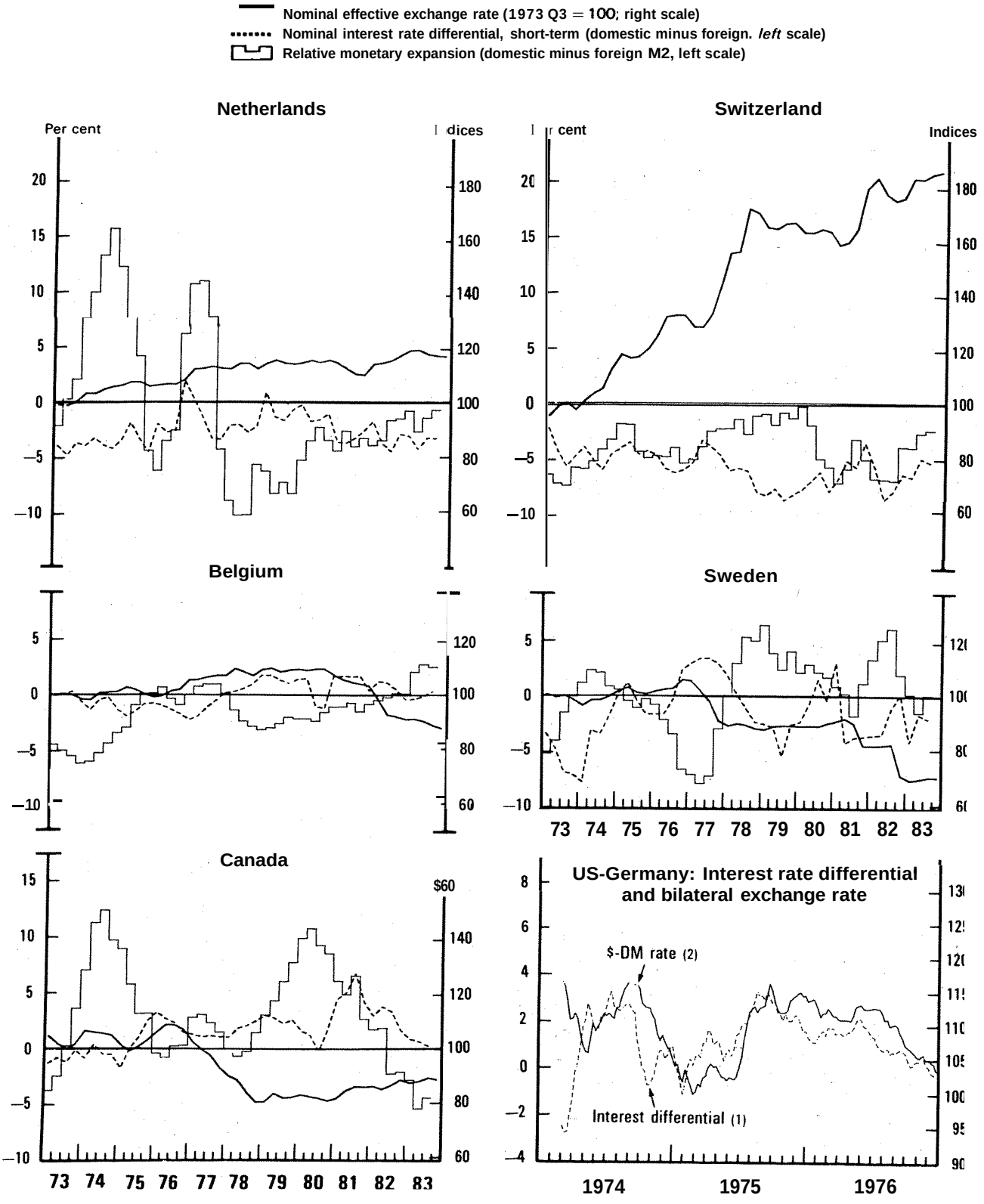


CHART 1 (cont)

Relative monetary growth, interest rate differentials and exchange rates



1. US CD rate less German 3-month interbank rate *(left* scale)
2. DM per 1 dollar *(right* scale).

disequilibria slowly accumulated during the sixties than of current economic developments and the stance of economic policies. In general, domestic monetary policies and conditions were not seriously altered to limit exchange-rate movements.

Macroeconomic policy appears to have been a relatively unimportant determinant of the exchange-rate movements in late-**1973** and **1974.** Rather, these appear primarily to have been related to market reaction to OPEC-I and to the the reduction of capital controls (e.g., abolition by the United States of all its controls on capital outflows and the relaxation in a number of European countries of controls on capital inflows). However, the relatively less accommodating monetary conditions and better price performance in the United States may also have contributed somewhat to the strengthening of the dollar in late-**1973.**

A direct and immediate association between macroeconomic policy changes and exchange-rate movements is not easy to see in the decline of the dollar through much of **1977** and **1978,** when overall macroeconomic developments may have been the major factor. The proximate causes probably included the deterioration of the current account, and the worsening of inflation (in particular relative to Japan and Germany), as well as possible shifts in currency preferences and adversely-evolving expectations. These latter may in part have reflected concern that monetary and fiscal policies being pursued would prove inflationary and warrant a lower value for the dollar in the future. The gradual tightening of monetary policy failed to stem the depreciation of the dollar (although it may have slowed it down) and a simplistic interpretation could have been obtained of a "perverse" correlation between nominal interest rates and the exchange rates.

A more direct association between policy and exchange-rate developments was seen in **1976** in the downwards pressure on the Italian lira, sterling and the French franc. In all three countries monetary expansion over the previous year had been high relative to that of other G. 10 countries (Chart 1), reflecting, in Italy and the United Kingdom at least, the monetary accommodation of widening fiscal deficits. Monetary policy tightened and interest-rate differentials widened in response to these exchange-rate pressures, presumably checking it to some extent. As exchange rates continued to weaken, though, a simplistic impression could again have been obtained of a "perverse" relationship between changes in interest-rate differentials and exchange rates. Ultimately all three currencies did rebound somewhat.

The importance of monetary policy was underlined in the more recent experiences of Italy, France and the United States. In Italy the public sector borrowing requirement again increased substantially during **1981,** but as monetary policy was relatively non-accommodating, exchange-rate pressure did not develop, On the other hand, the expansionary fiscal policy adopted in France in **1981** was accommodated by monetary expansion, which appears to have been reflected fairly directly in adverse pressures on the exchange rate. In the United States the mix of

relatively expansionary fiscal policy and tight monetary policy is generally considered to be one of the causes of the significant appreciation of the dollar in **1981** and the first part of **1982.**

Monetary policy also has been used successfully to maintain a "hard currency" option. For example, in the Netherlands an acceleration of inflation and speculation on a revaluation of the Deutschemark in **1976** put pressure on that country's "hard currency" policy. The authorities reacted by tightening domestic monetary conditions. The guilder appreciated against other currencies, leading to a substantial squeeze on corporate profits and, subsequently, a depressed level of economic activity. However, the combination of a strong exchange rate and the reduction in monetary expansion resulted in a sharp reduction in inflation.

An alternative approach in such circumstances would be to avoid forcing adjustment by the domestic real sector through a policy of stabilizing the real exchange rate with non-sterilized intervention to depreciate the nominal exchange rate. While output **loss** is avoided in the short run, the implied domestic monetary expansion combined with depreciation, would tend to destabilize domestic prices further. It is precisely in these circumstances that "vicious circle" mechanisms, whereby inflation and devaluation reinforce each other, take hold. In Sweden in **1975** and **1976,** and to some extent in **1980** and **1981,** the real effective exchange rate (as measured by relative unit labour costs) appreciated steadily as a result of an adverse inflation differential caused by rapid increases in wage costs. In both cases, considerations of competitiveness led the authorities to devalue the currency, exacerbating domestic inflation.

Exchange rates may also be influenced to some degree by reasonably firm market expectations about the ***future*** evolution of policy (as opposed to the effects of its actual stance at a given moment). It is argued by many that the present value of the dollar is an example of this; another may be the sharp rise in the pound sterling in **1979** and **1980** despite relatively high inflation in the United Kingdom. This rise reflected, in part, the effects of North Sea oil, but it also may be partly ascribed to the apparent credibility of the new government's commitment to a policy of disinflation and, in these circumstances, the attractiveness of high nominal interest rates. Although the currency appreciated to what many observers considered an unsustainably high level, this initially did not affect policy. During **1982,** as noted above, the exchange-rate became one indicator used in the setting of U.K. monetary policy.

Market expectations about future policies (and performance) may have been one factor behind the shift in currency preferences from the dollar to the Deutschemark and the Swiss franc in **1977** and **1978.** When real exchange rates appreciated to the point of being in conflict with the ultimate goals of the authorities, both German and Swiss authorities reacted by actively intervening and temporarily abandoning monetary targets. To a large extent this reflected the view that the apparent substantial shift in the demand for assets denominated in domestic

currency could be met through increased supply without leading to excessive inflation, provided the deviations from financial targets were once-and-for-all temporary measures.

Some further understanding of the interaction of policies, expectations and exchange rates may emerge from the fact that some of the major exchange-rate slides of the last decade (the lira and the pound in 1976, the dollar in 1978 and the French franc in 1983) were finally checked only by the adoption and announcement of a package which appeared to involve a significant shift of policy stance. This suggests that policy changes can affect exchange rates, if sufficiently massive or well conceived (in particular with respect to their effects on market expectations).

Looking over the period of floating, one striking feature of Chart 1 is that movements of exchange rates and nominal interest-rate differentials have not been particularly close. One exception was the dollar-DM rate and the US-Germany short-term interest-rate differential in the period from 1974 to 1976 (Chart 1, last panel). However, this relationship was much weaker between the effective exchange rate of the dollar and the U.S. interest-rate differential vis-à-vis other major countries on average and was practically non-existent for other countries.

Some overall impressions

Consideration of the interaction of exchange rates and macroeconomic policies was pursued more globally by looking at a set of scatter diagrams relating net exchange-rate changes to various indicators of relative policy stance over the period from 1973 to 1983 (Chart 2).

Panel I of that chart suggests an inverse relationship between nominal exchange-rate changes and relative growth of the money supply: with appreciation occurring in countries with a structurally relatively slow growth of the money supply and ***vice versa.*** Panel II shows the converse of this point: relatively low nominal interest rates in countries with appreciating currencies and vice ***versa,*** However, in the diagram in Panel III, which relates relative "real" interest rates to "real" exchange-rate changes, no firm pattern emerges on this simple basis.

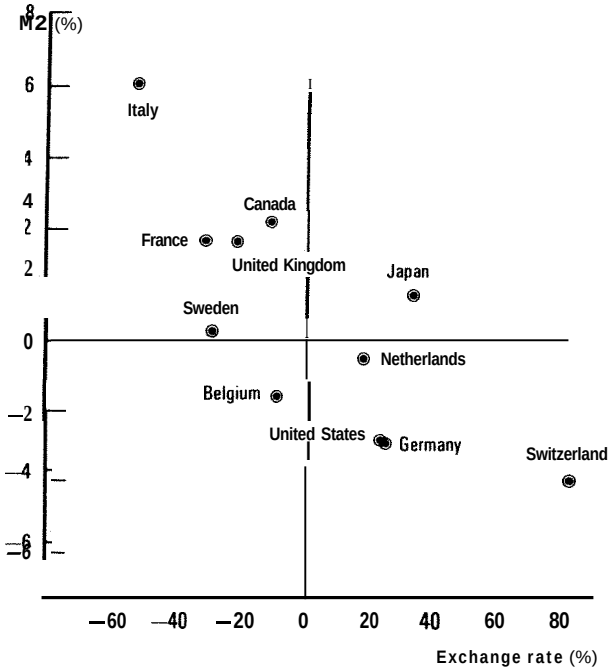
It should be emphasised that these are long-term or structural relationships. In the short run, ***changes*** in interest-rate differentials or monetary policy more generally might be expected to induce corresponding changes in exchange rates: for a time, and abstracting from structural considerations, relatively high interest rates might be associated with an improving exchange rate. However, timing is very relevant here; the episodes reviewed in the previous section also noted apparently "perverse" short-term associations between the evolution of interest-rate differentials and exchange rates.

Interest rates and exchange rates are more likely to be positively associated in periods of broadly neutral expectations of exchange rate changes (as for the $-DM

CHART 2

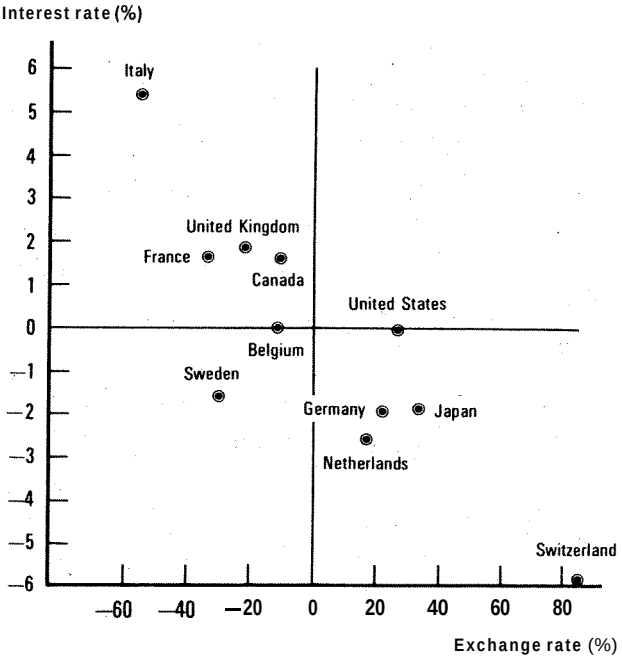
Panel I

Average relative monetary expansion
(domestic M2 minus foreign M2)
and net change in effective exchange rate
(from **1973 Q3** to **1983 Q3**)



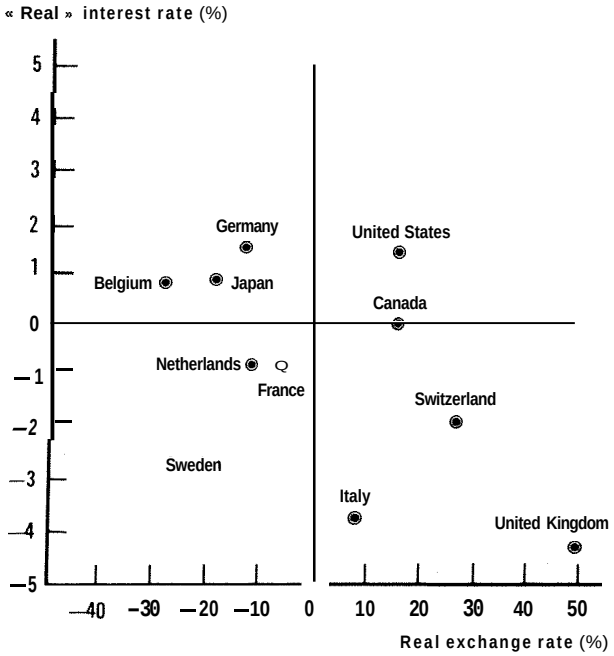
Panel II

Average short-term
interest rate differential
(domestic minus foreign)
and net change in effective exchange rate
(from **1973 Q3** to **1983 Q3**)



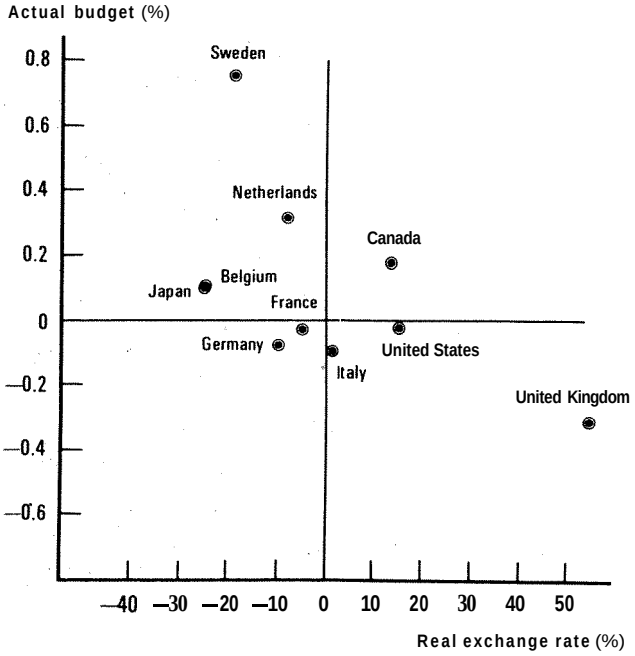
Panel III

Average inflation-adjusted
short-term interest differential
(domestic minus foreign)
and net change
in real effective exchange rate
(from **1973** Q3 to **1983** Q3)



Panel IV

Average relative changes
in actual budget **1973-1982**
(+ = relatively expansionary)
and net change in real
effective exchange rate



rate in 1975 and 1976), or in periods of interest-related expectations (the United States in 1980) and in the first phase of a policy of disinflation which the market feels is likely to succeed (the United Kingdom in 1979 to 1981, and the United States during the first year and a half of the present Administration.)

Turning to the interaction of the relative stance of fiscal policy and exchange-rate changes, Chart 2, Panel IV might suggest an association between relative actual budget positions and real exchange rates, though this impression is much less clear if the two outlying countries are ignored. This interaction is explored further in Chart 3 which combines countries' relative budget positions, relative monetary expansion (or interest rates), and exchange rates for the period of floating (1973 to 1982). Even though these results must be regarded as tentative, given the problems of comparing in a reasonably simple way the policy stance and policy mix of several countries, the overall picture provided by Chart 3 is of interest. Broadly it suggests that over a period of several years, nominal exchange rates may be associated more with monetary than with fiscal policy stance, while real exchange rates are associated more with fiscal than with monetary factors.

This view is sustained by most – but not all – of the country-positions shown in Chart 3. Canada and Sweden, with relatively expansionary fiscal policy and relatively rapid monetary growth, have a depreciating currency. Countries with an unambiguously contractionary mix, Germany and the United States, have an appreciating currency (Panel I). For most of the countries which combine a relatively expansionary budget position with relatively slow monetary growth, and vice-versa, Chart 3 suggests that nominal exchange rates vary in line with monetary policy. Italy, the United Kingdom, and France have a depreciating currency in line with a relatively expansionary monetary conditions, and despite a relatively contractionary budget position. On the other hand, the Netherlands, with an opposite mix, has an appreciating currency. Broadly the same conclusions are reached when relative budget positions are combined with nominal interest differentials (Panel II). Finally, relative budget positions – either cyclically-adjusted or actual – seem to have a somewhat stronger impact on real exchange rates than do monetary variables (Panel III).

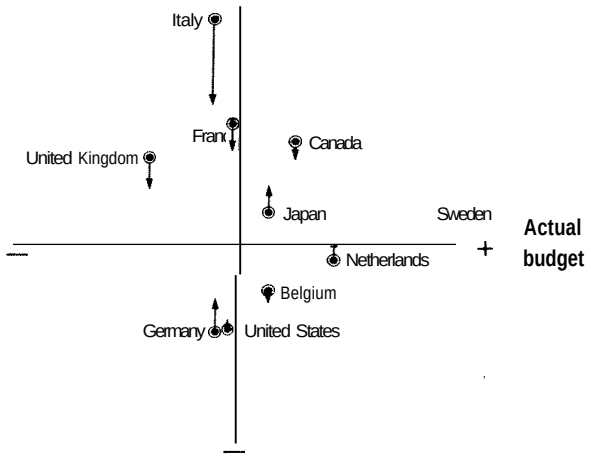
CONCLUDING COMMENTS

Ultimately the overall thrust of a country's macroeconomic policies relative to those abroad will 'go far in determining the so-called "fundamentals", such as productivity, inflation, competitiveness and the current account; and these in turn will be reflected in the exchange rate. In the short run, financial effects may

CHART *3*

Selected macro-economic variables and exchange rates

I. Relative monetary growth, relative budget positions and exchange rates (1973-1982)

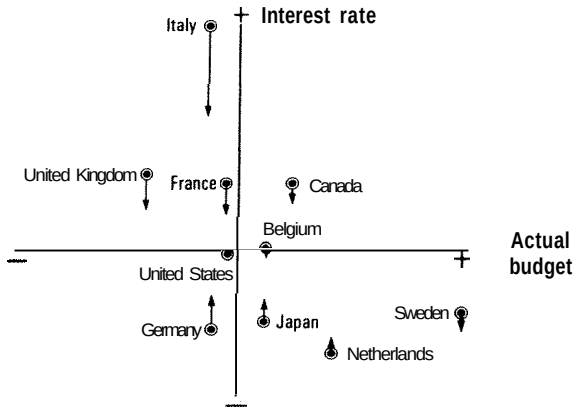


M2 = annual average rate of growth of money supply (M2) relative to other G 10 Countries (+ = relatively expansionary)

Actual budget = average annual change in budget balance (as % of GNP/GDP) relative to other G 10 Countries (+ = relatively expansionary)

↑↓ = annual average change in effective exchange rate (——— = 5 %)

II. Relative interest rates, relative budget positions and exchange rates (1973-1982)

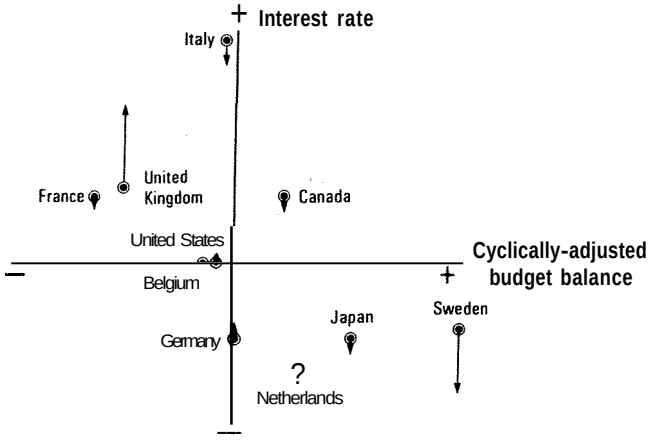


Interest rate = average short-term interest differential (+ = domestic rates higher than rates in other G 10 Countries)

Actual budget = as above

↑↓ = as above (——— = 5 %)

III. Relative interest rates, relative cyclically-adjusted budget positions and real exchange rates (1973-1982)



Interest rate = as above

Cyclically-adjusted budget = average annual change in cyclically-adjusted budget balance (as % of GNP/GDP) relative to other G 10 Countries (+ = relatively expansionary)

↑↓ = annual average change in real exchange rate (——— = 2 %)

dominate, importantly influenced by expectations and uncertainty about the orientation of policy. Despite the inevitable uncertainties, the evidence assembled for this paper does suggest that monetary and fiscal policy in themselves affect the exchange rate in broadly predictable ways over the policy-relevant horizon, at least as regards the direction of change.

This does not mean that the authorities have at all close control over the exchange rate – even supposing that they were prepared to attach a high weight to exchange-rate considerations in the setting of their macro instruments. The proportion of exchange-rate variation "explained" by monetary or fiscal variables, even abstracting from short-run volatility, is typically not high and tends to change with the sample period. Little confidence can be attached to the empirical estimates of the *size* of the effects of monetary and fiscal policy changes and even less confidence can be attached to the timing of such effects.

The impact of determined use of macroeconomic policies on the exchange rate will be enhanced if market perceptions are such that expectations work with, rather than against, what policy is seeking to achieve. With respect to the power of monetary policy to stabilise the exchange rate through adjustment of interest rates, for example, evidence suggests that in periods of particularly unsettled markets, the authorities may not be able to arrest downward pressure with minor policy adjustments. Success may require a quantum change, possibly accompanied by other measures demonstrating a resetting of the orientation of macroeconomic policy (such as occurred in the United Kingdom in late 1976, the United States in November 1978 and October 1979). By the same token, a relatively minor adjustment of the monetary stance may spark off prolonged pressure if the market sees the move as evidence of a policy orientation inconsistent with exchange-rate stability.

Abstracting from the small group of countries whose currencies are truly international, there seems no reason, either theoretical or empirical, to doubt that the classic ingredients of stabilization packages – lower money growth and reduced budget deficits – will, sooner or later, stem or reverse downward exchange-rate pressure; while lax monetary and fiscal policies will tend to be associated with currency weakness.

Turning to the small group of major currencies, how much difference is made by the fact that if monetary and fiscal policy are adjusted in the same direction, e.g. towards tightening, they could have offsetting effects on the exchange rate? Is there scope for an asymmetric use of monetary and fiscal policy to combine, say, an expansionary effect on domestic demand with a strengthening of the exchange rate? In practice, the only case over the last decade for which an asymmetric mix of policy seems to have been an important factor affecting the exchange rate concerns the dollar in the recent past. Yet the strength of the dollar has gone beyond what any empirical work would attribute to the combined effects of tight money and a large budget deficit.

There seem to be several reasons why the scope for asymmetric policy is limited. First, expectations may be such that the impact on the exchange market of asymmetric monetary and fiscal policy may well outweigh the impact of a single fiscal move's having the "wrong" direction of effect on the exchange rate. Second, in a number of countries, fiscal action is likely to be at least partially accommodated; the more it is, the less the issue arises. Third, even if the interest-rate effects of fiscal easing predominate in the short run, it could be expected in most countries that the current account effect would assert itself later, causing depreciation.

There are reasons why the United States may be a special case: the "safe haven" motive, the independence of the Federal Reserve, the relatively small trade sector combined with relatively very large potential capital flows. Whether these factors will continue to dominate remains to be seen.

NOTES

1. More detail (and a bibliography) of the issues discussed in this part – in particular on theoretical models of exchange-rate determination and differences across countries in the exchange rate as a policy target – car! be found in ***Exchange-Rate Management and the Conduct of Monetary Policy*** forthcoming, OECD.
2. For a detailed sumary of some of the more important attempts to test empirically various aspects of exchange-rate determination on a single-equation basis, see ***op. cit.***
3. Chan-Lee, J.H and Kato, H., "A Comparison of Simulation Properties of National Econometric Models", ***OECD Economic Studies,*** Spring **1984,** pp. **109** to **150.**
4. The models include: the United States MCM, Division of International Finance, Board of Governors of the Federal Reserve System; the United Kingdom H.M. Treasury: France METRIC, INSEE; Germany the Bundesbank; Canada 1 RDXF, Bank of Canada, Canada 2 CANDIDE, Economic Council; Japan World Model, E.P.A. These models have been developed in the institutions listed, but should not be interpreted as necessarily reflecting their views.
5. For a precise description of model equations and parameter values used in these simulations see Masson, P. and Blundell-Wignall A., "Fiscal Policy and the Exchange Rate in the Big Seven ... Transmission of U.S. Government Spending Stocks", forthcoming ***European Economic Review.*** A very similar model structure – but for only two countries – is given in Masson ***et al*** in this issue of this journal.
6. The discussion here is based on an examination of the experience of the countries participating in the General Arrangement to Borrow, the so-called "G. **10**" countries. They are United States, Japan, Germany, France, United Kingdom, Italy, Canada, Netherlands, Switzerland, Sweden, and Belgium. Relative positions given here for any country are measured with respect to the other countries in the group only.